

Portland to 32° at Roseburg and 34° at Olympia; Middle Pacific, 22° at San Francisco, to 26° at Sacramento and 31° at Red Bluff; South Pacific, 27° at San Diego to 36° at Visalia, 40° at Los Angeles and 50° at Campo.

Frosts were reported very frequently north of the 38th parallel and east of the 102nd meridian. South and westward of these boundaries they occurred in the various States on the following dates: *North Carolina*, 1st to 7th, 10th, 14th, 15th, 17th; *South Carolina*, 2nd, 5th, 6th; *Stateburg*, 2nd, 5th, killing blossoms and buds on low grounds; *Georgia*, 1st, 2nd, 5th; *Quitman*, 2nd, killing tender vegetation; *Florida*, 2nd, 3rd, 5th; *Alabama*, 2nd, 6th, 10th, 15th; *Green Springs*, 2nd, killing vegetation; *Mississippi*, 2nd, 5th, 14th; *Tennessee*, 1st, 2nd, 4th, 5th, 10th, 14th, 16th, 17th; *Arkansas*, 1st, 2nd, 4th, 14th; *Louisiana*, 1st, 2nd, 5th, 14th; *Texas*, 1st, 4th, 12th, 13th, 14th; *Cleburne and San Antonio*, 14th, killing vegetation; *Indianola*, 14th, killing cotton plants and garden truck; *Clarksville*, 14th, very destructive to peaches, apples, pears and plums, early corn had to be replanted in many localities, oats badly damaged, and the young foliage of forest trees extensively destroyed; *New Mexico and Arizona*, 13th, 14th; *Colorado*, 4th, 9th, 15th, 17th; *Utah*, 8th, 13th, 23rd, 25th; *Nevada*, 11th, 12th, 24th; *Carson City*, 24th, killing fruit and vegetables; *California*, 7th, 8th, 11th; *Oregon*, 12th, 30th; *Umatilla*, 30th, slightly damaging fruit trees and grape vines; *Idaho*, 1st to 4th, 7th, 8th, 12th, 28th, 30th; *Montana*, 1st to 4th, 6th to 13th; 24th, 25th, 27th to 30th. *Washington Territory*, 8th, 12th, 23rd, 26th, 30th; *Dayton*, 30th, slight damage to vegetation, which is about a month in advance of the usual growth for this period.

PRECIPITATION.

The general distribution of rain-fall (including melted snow) for April, 1881, is shown on chart No. III from the reports of over 500 stations. From the table in the left-hand corner of the chart is obtained a monthly average for each of the various districts, determined from the records (covering a period of many years) of Signal Service stations, and also a comparison of the present month with such averages. In general the rain-fall is considerably below the normal, only two remote and comparatively unimportant districts, viz: the Florida Peninsula and the Northern Pacific coast region, show the slightest excess. The most marked feature of this important subject for the month, is not so much the deficiency in any particular district, as that this deficiency is remarkably general, affecting in a striking manner those districts which are usually subject to heavy precipitation at this period of the year. As compared with the previous records of Signal Service observations for the month of April since 1874, no such wide-spread deficiency has ever been reported. The departures from normal are most marked, save two exceptions, over the northern sections of the country, the largest, —2.34, being reported from New England. There has been little if any variation from the accustomed diversity of rain-fall over the Rocky Mountain and Plateau districts, the largest amount, 4.64 inches, fell on the summit of Pike's Peak, while an entire absence of rain was reported from scattering stations in Arizona, California, Nevada and Utah.

In connection herewith the following notes from voluntary observers are of interest: *Riley, Ill.*, monthly rain-fall 1.74 inches below mean of past 20 years; dryest month ever observed. *Lawrence, Kans.*, rain-fall 1.91 below mean of past 13 years. *Gardiner, Me.*, monthly rain-fall 1.82 below mean of past 45 years; dryest April occurred in 1844. *Sandy Springs, Md.*, rain-fall remarkably small for April. *St. Louis*, the "Missouri Weather Service" reports monthly rain-fall considerably below the average. The "Nebraska Weather Service" reports 2.86 inches as an average for the whole State, which is more than three times as much as fell in April, 1880; rain-fall in western part of State exactly the average of 20 years, in the eastern part a little below the usual amount. *Contoocookville, N. H.*, monthly rain-fall 2.00 inches below the normal; dryest April on record. *Grafton, N. H.*, monthly rain-fall considerably below the normal; dryest April on record. *Palermo, N. Y.*, dryest April in past 28 years, excepting 1879. *Waterburg, N. Y.*, monthly rain-fall 1.19 below mean of past 19 years. *Argyle, N. Y.*, monthly rain-fall considerably below the mean; crops suffering from drought. *Cleveland*, monthly rain-fall 0.82 below mean of past 26 years. *Mission House, Wis.*, monthly rain-fall considerably below the average; month remarkable for the absence of the customary April rains.

Special Heavy Rains.—1st, Wellsboro, Pa., 3.16 inches. 4th, Laredo, 2.53. 7th, St. Louis, 2.62; Auburn, Ala., 2.75. 12th, Wellsboro, Pa., 3.26; Green Springs, Ala., 3.00. 14th, Hatteras, 4.83; Fort Macon, 3.04; Kittyhawk, 2.77; Lincoln, Neb., 3.00. 17th and 18th, Battle Creek, Mich., 3.00. 20th, Brackettville, 2.50. 20th and 21st, Mason, 2.60; Henrietta, 4.70. 21st, Corsicana, 3.30; Melissa, Tex., 3.00. 21st and 22nd, Graham, Tex., 3.36. 22nd, Port Eads, 6.29. 24th, Mobile, 5.34; Pensacola, 2.73; Fort Barrancas, Fla., 3.08. 25th, Highlands, N. C., 4.85. 25th and 26th, Galveston, 3.20.

Largest Monthly Rain-falls.—Mobile, 9.21 inches; Elsworth, N. C., 7.38; Highlands, N. C., 7.20; Neah Bay, Wash. Ty., 7.02; Hatteras, 6.88; Franklin, N. C., 6.70; Bowling Green, Ky., 6.09; Cape Henry, 6.03; Quitman, Ga., 5.90; Memphis, 5.74; Ft. Barrancas, Fla., 5.55; Ft. Canby, Wash. Ty., 5.51.

Smallest Monthly Rain-falls.—Summit, Chico and Indio, Cal., Tecoma, Nev., Ogden, Utah, and Maricopa and Benson, Ariz., none; Reno, Nev., 0.02 inch; Golconda, Nev., 0.03; Toano, Nev., 0.05; Anaheim, Cal., and Ft. Brown, Tex., 0.06; Solidad, Cal., and La Mesilla, N. M., 0.09; Ft. Benton, Mont., and Spiritwood, Dak., 0.10; Carson City, Nev., and camp near Presidio, Tex., 0.12; Ft. McDermitt, Nev., 0.16; Santa Maria, Tex., and Browns, Nev., 0.13; Wells, Nev., 0.17; Farmington and Mojave, Cal., 0.18; Elko, Nev., and Lunenburg, Vt., 0.20; Ft. Assinniboine, 0.21; El Paso, 0.22; Socorro, 0.23; Cornish, Me., 0.26; Friendship, N. Y., 0.27; Colton, Cal., 0.28; Ft. Lyon, 0.29; Ft. Totten, Dak., Plattsburg Barracks, N. Y., and Brownsville, Tex., 0.30; Merced and Newhall, Cal., 0.34; Otego, Nev., Ft. Shaw and Ft. Keogh, 0.35; Ft. Niagara, N. Y., 0.38; Ft. Bridger, Wyo. T., 0.39; Ft. Lewis, Col., and Ft. Elliott, Tex., 0.40; Madison Barracks, N. Y., and Ft. Wingate, N. M., 0.42; Hot Springs, Nev., and Argyle, N. Y., 0.43; Salinas, Cal., Beowawe, Nev., and Escanaba, 0.44; Rapid City, Dak., Northport, Mich., and Ft. Wallace, Kan., 0.45; Los Angeles, Stockton and Ft. Custer, 0.46; Yates Centre, Kan., and St. Paul, 0.47; Ravenna, Cal., and Silver City, 0.48; Truckee, Cal., 0.49; Brighton, Alta, San Fernando and Tehachapi, Cal., Denver and Hermosa, Col., Hector, N. Y., and Neillsville, Wis., 0.50.

Rainy Days.—The number of days on which rain or snow has fallen varies as follows: New England, 7 to 19; Middle Atlantic States, 7 to 17; South Atlantic States, 5 to 15; Eastern Gulf States, 5 to 9; Western Gulf States, 2 to 12; Ohio valley and Tennessee, 10 to 19; Lower Lake region, 7 to 14; Upper Lake region, 4 to 15; Upper Mississippi valley, 10 to 20; Missouri valley, 3 to 12; Red River of the North valley, 8 to 13; Texas, 4 to 12; Rocky Mountains, 5 to 15; Middle Plateau, 4 to 10; Southern Plateau, 1 to 9; California, 3 to 10; Oregon, 5 to 18; Washington Territory, 14 to 19.

Cloudy Days.—The number varied in New England from 2 to 10; Middle Atlantic States, 5 to 12; South Atlantic States, 2 to 13; Eastern Gulf States, 1 to 9; Western Gulf States, 5 to 9; Ohio valley and Tennessee, 7 to 16; Lower Lake region, 6 to 10; Upper Lake region, 2 to 9; Upper Mississippi valley, 4 to 12; Missouri valley, 6 to 14; Red River of the North valley, 3 to 16; Texas, 1 to 10; Rocky Mountains, 5 to 10; Middle Plateau, 3 to 11; Southern Plateau, 1 to 6; California, 1 to 13; Oregon, 11 to 19; Washington Territory 13 to 15.

Snow.—The extreme southern latitude at which snow has fallen is a remarkable feature of the month. Between the 77th and 107th meridians no less than seven localities report snow as far south as latitude 35° between the 1st and 13th, and, in two instances, below that parallel. In the various northern districts it fell on the following dates: *New England.*—1st, 2nd, 5th, to 7th, 11th to 19th, 22d, 24th, 25th, 26th, 29th, 30th. *Middle Atlantic States.*—1st to 8th, 11th to 13th. *North Carolina.*—Charlotte, 1st, 4th. *Tennessee.*—1st, 4th, 5th. *Ohio Valley.*—1st to 6th, 9th, 11th, 13th, 15th. *Lower Lake Region.*—1st to 8th, 11th to 15th. *Upper Lake Region.*—1st to 6th, 10th to 16th, 28th, 29th. *Upper Mississippi Valley.*—1st to 4th, 7th to 15th, 24th to 26th. *Missouri Valley.*—2d to 12th. *Valley of the Red River of the North.*—1st to 3rd, 8th, 12th to 15th. *Northern Rocky Mountain Slope.*—1st to 12th, 23rd to 25th. *Rocky Mountains.*—5th to 14th, 20th to 23rd. *Northern Plateau.*—5th to 11th, 12th, 16th, 17th. *Utah.*—9th to 12th. *Oregon.*—Albany, 8th, 18th. *California.*—In mountains, 17th, 22nd, 23rd.

Largest Monthly Snow-falls.—Mount Washington, 45.60 inches; Pike's Peak, 44.60; Genoa, Neb., 12; Newport, Vt., 11; Summit, Cal., 10; De Soto, Neb., 9.25; Halleck, Nev., 6.

The following items, regarding in part the snow-storms of the month, will be found of interest. Sioux City, Ia., 8th, very heavy storm of sleet and snow, over ten inches on the level; wires broken and railroad communication obstructed. Orange Court House, Va., 9th, four inches fell during night. Fairmount, Min., 11th, very heavy snow in southern Minnesota during night; trains delayed. Greenbrier county, W. Va., snow sixteen inches deep in several localities west of White Sulphur Springs. Derby Line, Vt., 15th, 16th, very heavy snow, eleven inches deep on the level. Westerville, Ohio, month opened with from twelve to fifteen inches of snow; 5th, snow-fall seven inches. Edgerton, Wis., 16th, snow-drifts from three to five feet high. Yankton, 13th, all railroads north and west still blockaded; the entire Missouri slope buried in snow. Sheldon, Ia., 8th, for sixty miles to the eastward whole country covered with from two to three feet of snow; the Chicago, Milwaukee and St. Paul R. R., for a distance of thirty miles, passed through snow-cuts, the walls of which were in many places above the tops of the cars. In Sanborn, Hartley, Spencer, Emmetsburg, Algona and other neighboring towns in Iowa, people have been cut off from the necessities of life, by snow blockades for the past three weeks, and until within a few days not a single train had passed through this section since the 1st of January; fully two-thirds of the stock in this section have perished. In the towns of Havelock and Winthrop, and others to the northward, 22nd, ground still covered with several feet of snow. In vicinity of Big Storm and Traverse Lakes, Dak., 22nd, snow partly gone from the hills, but in the ravines and gulches lies to a depth of from fifteen to fifty feet. Manitoba, 20th, snow very heavy about the tributaries of the Mississippi.

Snow from a Cloudless Sky.—Logansport, Ind., 2nd, from 8.30 to 9 p. m. fine particles of snow fell, there being no clouds visible for two hours previous, the moon and stars shining with but slightly diminished brilliancy.

Snow on Ground at End of Month.—Isolated stations report the following depths in inches: Auburn, N. H., 5; Mt. Washington, 20; Burlington, Vt., 0 to 1; Oswego, N. Y., trace; Fallington, Pa., 0.25; Edgerton, Wis., 2.81; near Ft. Madison, Ia., 4.50; Morriston, Dak., 18; Deadwood, Dak., trace; Pike's Peak, 16.75.

Hail-storms were of considerable frequency west of the Mississippi and north of the Ohio. Beyond these boundaries, to the eastward, only three stations reported, viz: Ocean City, N. J., 2nd; Wytheville, Va., 7th; Point Judith, R. I., 14th. To the westward in the various States on the following dates: Texas, 5th, 7th, 20th, 21st, 24th, 25th and 29th. Louisiana, 12th, 21st, 29th. Arkansas, 11th and 12th; Fayetteville, 11th, very violent, storm preceded by dark heavy clouds rushing together from northwest and southwest, hailstones falling as they met; many stones from two to two-and-a-half inches in diameter; iron and tin roofs badly damaged. Indian Territory, 17th. Missouri, 29th and 30th; Ironton, 29th, town and surrounding country visited by the heaviest hail-storm ever known in this section: storm lasted about five minutes; most of the stones were as large as hen's eggs, some of them measuring more than seven inches in circumference; nearly all glass in the northern side of buildings was broken and foliage and vegetation badly damaged. Illinois, 9th, 11th, 28th and 29th. Indiana, 11th, 25th and 28th; the storm of the 28th seemed to be quite extensive, as it was reported from southern Illinois, northwestward along the Ohio River to points beyond Cincinnati. Ohio, 15th and 28th. Michigan, 16th, 28th and 30th. Minnesota, 5th, 29th and 30th. Dakota, 5th, 14th, 26th, 29th and 30th. Nebraska, 6th and 29th. Kansas, 1st, 2nd, 10th, 17th, 20th, 29th and 30th. New Mexico, 5th, 6th, 7th, 12th and 16th. Colorado, 5th, 6th, 8th, 12th, 29th and 30th. Wyoming, 9th, 10th, 14th, 17th and 23rd. Montana, 19th and 27th. Utah, Salt Lake City, 23rd. Nevada, Pioche, 18th. Arizona, 15th and 16th. California, Yosemite valley, 30th, very severe, bits of jagged ice as large as filberts fell for five minutes, covering the ground. Idaho, Ft. Lapwai, 23rd. Washington Territory, Bainbridge Island and Neah Bay, 24th.

RELATIVE HUMIDITY.

The percentage of mean relative humidity for the month ranges as follows: New England, 54 to 80; Middle Atlantic States, 54 to 78; South Atlantic States, 55 to 85; Eastern Gulf States, 59 to 77; Western Gulf States, 54 to 75; Ohio Valley and Tennessee, 60 to 68; Lower Lake region, 62 to 74; Upper Lake region, 58 to 73; Upper Mississippi valley, 61 to 72; Missouri valley, 62 to 73; Red River of the North valley, 72 to 76; Texas, 50 to 75; Middle Plateau, 33 to 42; Southern Plateau, 30 to 76; California, 43 to 77; Oregon, 56 to 69; Washington Territory, Olympia, 78. *High stations* report the following percentages not corrected for altitude: Pike's Peak, 70.8; Santa Fe, 32.7; Cheyenne, 51.2; Denver, 45.2; Mt. Washington, 79.6.

WINDS.

The prevailing winds during the month of April, 1881, at Signal Service stations are shown on chart No. II by arrows, which fly with the wind. Throughout the country east of the Mississippi the winds were from *west* to *northwest* except *southwest* along the South Atlantic coast. In the Western Gulf States and Texas, *southeast* to *southwest* and *south*. Along the eastern slope of the Rocky Mountains, *northeast* to *northwest* and *north*. Over the Middle and Northern Plateau regions, *west* and *southwest*. Southern Plateau, *variable*. Along the Pacific coast, *west* and *northwest*, except *southerly* in the Northern Pacific coast region.

Total Movements of the Air.—The following are the largest total movements at Signal Service stations: Mt. Washington, 25,080; Pike's Peak, 13,503; Portsmouth, 12,886; Hatteras, 12,670; Cape May, 11,717; Chincoteague, 11,515; Kittyhawk, 11,447; Delaware Breakwater, 11,006; New Shoreham, 10,863; Wood's Holl, 10,743; Indianola, 10,382; Cape Henry, 10,373; Dodge City, 9,667; Macon, 9,335; Fort Griffin, 9,320; Sandusky, 9,150; Sandy Hook, 9,123; Barnegat, 9,108; Ft. Elliott, 9,010; Champaign, 8,991; Decatur, 8,610; Philadelphia, 8,514; Ft. Sill, 8,421; Galveston, 8,214; Cedar Keys, 8,032. The *smallest* are Florence, 1,842; Phoenix, 2,064; Roseburg and Lewiston, 2,271; La Mesilla, 2,405; Visalia, 2,424; Tucson, 2,683; Deadwood, 2,746; Silver City, 2,975.

High Winds.—Winds of 50 miles per hour and over, were reported as follows: On the summit of Mt. Washington, 2nd to 7th, 11th, 12th, 14th to 19th, 21st to 23rd, 24th, 25th, 26th, 28th, 29th, 30th, on four of these dates the wind reached a velocity of 100 miles or over; the maximum velocity, 120 miles NW., occurred on 2nd, 3rd, 29th. On the summit of Pike's Peak, 2nd, 13th, 14th, 15th; maximum velocity 68, NW. 14th; Eastport, 52, NE. 15th; Thatcher's Island, 55, NE. 15th; New Shoreham, 60, NE. 15th; Cape Henry, 52, N. 14th; Kittyhawk, 76, NE. 14th; Hatteras, 60, N. 14th; Portsmouth, N. C., 88, NE. 14th; Ft. Macon, N. C., 52, N. 14th; Indianola, 51, NE. 4th; North Platte, 54, S. 30th; Fort Stevenson, Dak., 50, W. 26th; St. Vincent, Minn., 56, SW. 26th.

Local Storms.—De Soto Co., Miss., 12th, about 2 p. m., violent tornado appeared to originate near Commerce, a small town on the Mississippi, where it wrecked ten cabins, three gin houses,